

Mineral Industry Surveys

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PRECIOUS METALS IN JUNE 1999

U.S. mines produced 31,900 kilograms (kg) of gold and 170,000 kg of silver in June 1999. Production of silver was up by 14% in Nevada compared with output in May.

Gold

Domestic.—A recent study by the Metals Economics Group compared operating costs of 39 U.S. gold mines with those of 37 Canadian gold mines. For the U.S. gold mines, an average cost of U.S.\$215 per ounce and a weighted average cost of U.S.\$195 per ounce were calculated. For the Canadian gold mines, the comparable figures were U.S.\$210 per ounce and U.S.\$195 per ounce. The majority of the U.S. gold mines were open-pit, heap leach operations, whereas the majority of the Canadian gold mines were underground operations using conventional cyanidation or flotation methods (Mining Journal, 1999d).

Placer Dome Inc. has temporarily shut one of its two Getchell gold mine operations in Nevada. Mining at Turquoise Ridge will be halted for one year because of high operating cost and low output. Work will focus on developing a larger-scale operation and more cost-efficient ore extraction (Mining Journal, 1999c).

International.—The South African Chamber of Mines reported that the total gold output for the first quarter was 110,000 kg (3.5 million ounces), down 6.6% for the same period in 1998. The Chamber also revised its gold production data for last year down 5% to 464,000 kg (14.9 million ounces) of gold (Platt's Metals Week, 1999b).

Placer Dome Inc. has suspended construction of its 70%-owned Las Cristinas gold mine in the remote jungle of Bolivar State, Venezuela. The mine, which was placed on care and maintenance, was expected to produce about 300,000 kg of gold after opening in 2001 with an initial gold output of almost 16,500 kg per year (Mining Journal, 1999b).

The World Gold Council reported that the demand for gold in the Gulf Emirate of Dubai rose 5% in the first quarter. Dubai gold purchases rose to 26,600 kg from 25,300 kg in the first quarter of 1998. The demand was boosted by Dubai City's gold promotion efforts during a March shopping festival and by various activities, such as a display of the world's longest gold chain (American Metal Market, 1999a).

South Africa's East Rand Proprietary Mines (ERPM) is no longer operating. The historic gold mine and its 5,000 employees are the first major casualties of the continuing low gold bullion price and the strengthening of South Africa's currency. The liquidation of ERPM, with the closure of many of its workings, also poses a threat to the neighboring Durban Roodepoort Deep mine, which could face problems with underground flooding from ERPM (American Metal Market, 1999b).

In Western Australia, at least 17 gold-processing plants have closed down as ore supplies diminished. An estimated 1,800 geologists were out of work and hundreds of drill rigs were idle. People are abandoning Western Australian mining towns to seek work elsewhere; in the key mining center of Kalgoorlie, retail sales have slumped by 15% in the past year, and the price of residential property has fallen by 10% (Mining Journal, 1999a).

Update.—There was a decrease in gold trading in June on the bullion market. The average daily turnover was 0.9 million kg of gold, down about 6% from May (American Metal Market, 1999d).

The World Gold Council (WGC) released results of a survey which indicated that the American public opposed the International Monetary Fund's (IMF) proposal to sell a portion of its gold. The IMF has planned to auction about 300,000 kg of gold, about 10% of its holdings, over several years. This amount is modest compared with the 4 million kg of gold that are

supplied to global markets each year. The last time the IMF auctioned gold was from 1976 to 1980, when the price of gold was surging (Washington Post, 1999). WGC surveys conducted in the United Kingdom, France, Germany, and Italy also indicated that private citizens were opposed to official gold sales, and would prefer an increase of gold bullion in the financial reserves of their countries (Platt's Metals Week, 1999a).

The Bank of England's first auction of 25,000 kg of gold on July 6 brought a strike price of \$261.20 per ounce. The auction was 5 times oversubscribed, however; about 75% of the bids were below the eventual strike price. The intra-day trading on the London Metal Exchange responded by falling from a high of \$263 per ounce of gold to \$256.60 per ounce of gold. The Bank of England had announced its intention to auction gold reserves two months earlier, which resulted in a \$30 per ounce reduction in the gold price (Metal Bulletin, 1999).

A gold-capped microchip developed at the Massachusetts Institute of Technology may help provide timely medication to patients. The microchip contains numerous pinhole-size reservoirs capable of holding 25 nanoliters of a medicine in solid, liquid, or gel form. Each reservoir, which is capped with a thin gold membrane, is opened at a predetermined time when a small electrical charge between the gold anode cap and a gold cathode melts the membrane, allowing the chemical to be released (American Metal Market, 1999c).

Silver

Europe's largest silver producer, KGHM Polska Miedz, reported that silver production in 1999 is expected to be slightly more than 1998, at 1,090 metric tons (t). The director of the company's precious metals and raw materials trading department expects that KGHM will produce about 16 t more silver than last year. The company produces the majority (90%) of its silver output as granules for use in the industrial production of photographic film and electronics (Mining Journal, 1999b).

Platinum-Group Metals

In 1998, global demand for palladium for use in autocatalyst reached 136,900 kilograms (kg), an increase of 39,500 kg from 1997 demand. Autocatalyst accounted 55% of 1998 palladium demand. Automobile manufacturers in Europe, Japan, and the United States used more palladium in response to tightening exhaust emissions legislation. In the United States, palladium sales to automobile manufacturers increased by 50% to 77,800 kg. European sales increased 30% to 44,200 kg. The other principal applications for palladium were dentistry (38,000 kg) and electronics (64,400 kg). Owing to higher prices for palladium, demand by these two sectors was down by about 14,900 kg as lower priced base metals were substituted for palladium. Despite reduced demand from the dentistry and electronics industries, overall demand for palladium increased by 8% in 1998 to 254,700 kg. At the same time, supply increased by 16% to 261,300 kg. Most of this increase was from Russia as its exports rose by 31,000 kg to 18,000 kg (Johnson Matthey,

South African mine output of palladium increased by about 2% in 1998 to 57,300 kg. Johnson Matthey estimated that Russia's Norilsk Nickel increased its mine production of palladium to

about 77,800 kg. In the United States, mine output increased by 25% to 10,600 kg, owing mainly to expansion at the Stillwater Mine in Montana. Canadian mine output of palladium was essentially unchanged.

Offering attractive driving range and quick refueling, fuel cells appear to be on the verge of challenging a variety of high-energy battery options that are under development to meet lower emissions requirements being imposed on motor vehicles in the United States. The concept behind the fuel cell was first demonstrated over 150 years ago. In its modern version, an individual cell consists of two electrodes with an electrolyte sandwich between them. Hydrogen is supplied to the anode and oxygen, supplied by air, to the cathode. Inside the cell, a proton exchange membrane and a platinum catalyst split hydrogen atoms into protons and electrons. The protons pass through the electrolyte while the electrons travel through an external circuit, generating an electrical current, before recombining with the protons and reacting with oxygen to form water. Multiple cells are connected to achieve ausable power output. Industry analysts estimate that well over \$2 billion is being channeled into development by the major auto manufacturers in Europe, Japan, and the United States. One manufacturer introduced the "Necar" to indicate its intent to bring to market a practical and commercially affordable passenger vehicle to the U.S. market within 5 years. Necar is a modified passenger vehicle which can accommodate 5 passengers and luggage as well as the fuel cell. The company says that 5 years ago a small van would have been required to hold the equivalent fuel cell and hardware. Fuel cell power units cost about 10 times that of a conventional gasoline engine; consequently fuel cell economics are not yet competitive with conventional gasoline engines (Metal Bulletin Monthly,

Update.—On September 1, 1999, the Defense National Stockpile Center (DNSC), Fort Belvoir, VA, announced the August PGM sales results under the Basic Ordering Agreement, DLA-PGM-01. Since August 1, 1999, DNSC has sold:

Iridium 37.324 kg Platinum 82.611 kg

for an aggregate value of \$1.4 million. The companies that were awarded material are: Heraeus Precious Metals Management, Inc., New York, NY, and Mitsubishi International Corp., New York, NY. For additional information visit the DNSC website at http://www.dla.dnsc.mil. For other inquiries call Cheryl Deister at (703) 767-5475 (Defense National Stockpile Center, 1999).

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${\bf TABLE~1}$ MINE PRODUCTION OF RECOVERABLE GOLD AND SILVER IN THE UNITED STATES, BY STATE 1/

(Kilograms)

				Other	
Gold	Arizona	California	Nevada	States 2/	Total
1998: p/					
June	183	2,000	25,600	5,530 r/	33,300
July	175	2,000	24,900	5,730 r/	32,800
August	181	1,800	26,400	5,950 r/	34,400
September	181	1,850	26,200	5,500 r/	33,700
October	189	1,850	25,700	5,780	33,600
November	182	1,840	25,000	5,630	32,600
December	179	1,830	25,500	5,920	33,500
January-December r/	1,840	18,700	273,000	72,700	366,000
1999:					
January	101 r/	1,340 r/	21,300 r/	5,170 r/	28,000 r/
February	W	1,170 r/	20,100 r/	4,820 r/	26,100 r/
March	108 r/	1,440 r/	21,000 r/	5,410 r/	28,000 r/
April	W	1,440 r/	20,900 r/	8,240 r/	30,600 r/
May	W	1,450 r/	21,700 r/	8,030 r/	31,200 r/
June	W	1,510	22,200	8,160	31,900
January-June	209	8,350	127,000	39,800	176,000
-				Other	
Silver	Arizona	Idaho	Nevada	States 3/	Total
1998: p/					
June	14,400	39,000	71,200	60,200	185,000
July	17,900	36,200	50,400	57,400	162,000
August	18,100	36,700	51,300	61,700	168,000
September	18,100	36,200	79,300	61,200	195,000
October	17,300	36,200	64,100	62,000	180,000
November	14,400	36,200	69,800	60,000	180,000
December	15,700	36,200	97,900	61,300	211,000
January-December	211,000	447,000	670,000	736,000	2,060,000
1999:					
January	15,400 r/	34,600 r/	46,500 r/	63,000 r/	160,000 r/
February	14,700 r/	31,200 r/	49,500 r/	56,200 r/	150,000 r/
March	17,600 r/	34,600 r/	66,100 r/	59,900 r/	178,000 r/
April	16,500 r/	33,400	45,600 r/	70,400 r/	166,000 r/
May	16,800	33,400	42,100 r/	66,500 r/	159,000 r/
June	16,800	33,400	48,000	71,300	170,000
January-June	97,700	201,000	298,000	386,000	983,000

p/ Preliminary. r/ Revised. W Withheld to avoid disclosing proprietary data.

^{1/} Data are rounded to three significant digits; may not add to totals shown.

^{2/} Includes Alaska, Colorado, Idaho, Montana, New Mexico, South Carolina, South Dakota, Utah, and Washington.

^{3/} Includes Alaska, California, Colorado, Missouri, Montana, New Mexico, New York, South Carolina, South Dakota, Tennessee, Utah, and Washington.

TABLE 2 SELECTED PRECIOUS METAL PRICES

(Dollars per troy ounce)

	Gold	Silver	Platinum	Palladium
Engelhard Industries:				
1998:				
Year				
Low/date	274.52 (August 28)	4.72 (August 31)	337.00 (October 30)	205.00
High/date	314.33 (April 24)	7.25 (February 6)	434.00 (April 14)	417.00
Average	295.24	5.54	374.61	289.76
1999:				
May:				
Low/date	269.71/28	4.91/28	351.00/4	293.00/4
High/date	289.09/6	5.47/13	367.00/28	349.00/14 and 18
Average	278.05	5.29	358.20	333.25
June:				
Low/date	259.24/17	4.91/4	346.00/22	327.00/29 and 30
High/date	268.25/2	5.27/30	369.00/4, 9, and 10	355.00/9
Average	262.41	5.07	358.55	341.73
July:				
Low/date	253.88/20	5.09/19	346.00/28 and 30	320.00/6
High/date	264.20/2	5.46/30	321.00/21	348.00/23
Average	256.89	5.23	351.19	338.91
Year to date				
Low/date	253.88 (July 20)	4.91 (January 4 , April 14, May 28, and June 4)	344.00 (January 28)	293.00 (May 4)
High/date	295.15 (March 11)	5.70 (February 12)	386.00 (February 23)	388.00 (April 20)
Average	277.61	5.22	360.26	346.00
Handy and Harman:				
1998:				
Average	294.12	5.53	XX	XX
1999:				
May	276.94	5.30	XX	XX
June	261.31	5.08	XX	XX
July	255.81	5.23	XX	XX
Average year to date	276.48	5.22	XX	XX
London Final: 1/				
1998:				
Average	294.16	5.55	XX	XX
1999:	* *			
May	276.44	5.27	XX	XX
June	261.31	5.03	XX	XX
July	256.08	5.18	XX	XX
Average year to date	276.39	5.20	XX	XX
XX Not applicable				

XX Not applicable.

1/ Silver price reported as "London Spot/US Eq."

Source: Platt's Metals Week.

$\label{eq:table 3} \mbox{U.S. IMPORTS AND EXPORTS OF GOLD 1/}$

(Kilograms of gold content, unless otherwise specified)

Period and country	Ores and concentrates 2/	Doré and precipitates	Refined bullion 3/	Ash and residues	Total 4/	Waste and scrap (gross weight)	Metal powder (gross weight)	Gold compounds (gross weight)
Imports for consumption:	concentrates 2/	precipitates	bullion 3/	residues	10tai 4/	(gross weight)	(gross weight)	(gloss weight)
1998	2,540	14,100	257,000	4,670	278,000	16,700	12,800	9,820
1999:	_ 2,340	14,100	257,000	4,070	278,000	10,700	12,000	9,820
March	- 5	1,270	19,300	40	20,600	2,340	429	223
April	- 3 4	741	11,800	(5/)	12,500	1,230	709	11
	- =====	/41	11,000	(3/)	12,300	1,230	709	11
May:	_	212			212			
Argentina		312	1.00		312			
Austria			168		168			
Bolivia			345		345	7		
Brazil			2,310		2,310			
Canada		3	9,820		9,820	96	303	
Chile	_	1	450		451	2		
Colombia			411		411	151		
Costa Rica			1		1	175		
Dominican Republic	_		1		1	341		
Germany		3			3			213
Korea						1,480		
Mexico	_	487	238	(5/)	726	234	11	
Nicaragua			461		461			
Peru		296	786		1,080			
Switzerland	_		346		346	1	1	
Other	1	30	259		290	120	1	40
Total	1	1,130	15,600	(5/)	16,700	2,610	316	253
Year to date	82	7,350	80,200	54	87,700	8,960	2,730	2,640
Exports:	_							
1998	401	91,600	430,000		522,000	58,900	196	781,000
1999:	_							
March		5,460	12,900		18,400	3,100	27	93,900
April	- 28	5,860	24,700		30,600	2,650	55	26,800
May:	_							
Canada		423	4		427	1,770		1,060
Italy						146		
Mexico	- 		1,870		1,870	<u></u>		
Peru	- 		486		486			
Singapore	<u>-</u>	2	1		3			100
Switzerland	-	7,470			7,470			
Turkey			29		29		25	
United Kingdom	-		6,450		6,450	915	10	20
Other	-	6	33		39	170	10	32
Total	- 	7,900	8,870		16,800	3,000	36	1,210
Year to date	 86	32,800	71.100		104,000	12,800	137	263,000
1/ Data are rounded to three si			. ,		104,000	12,000	137	203,000

^{1/} Data are rounded to three significant digits; may not add to totals shown.

^{2/} Includes gold content of base metal ores, concentrates, and matte imported for refining.

^{3/} Bullion also moves in both directions between U.S. markets and foreign stocks on deposit in the Federal Reserve Bank. Monetary gold excluded.

^{4/ &}quot;Waste and scrap," "Metal powder," and "Gold compounds" not included in "Total."

^{5/} Less than 1/2 unit.

TABLE 4 U.S. IMPORTS AND EXPORTS OF SILVER, REFINED AND AS NITRATE 1/

(Kilograms)

Period and country	Bullion (silver content)	Doré (silver content)	Total (silver content)	Other unwrought silver (gross weight)	Metal powder (gross weight) (Silver nitrate
Imports for consumption:	(Silver content)	(Sirver content)	(Sirver Content)	(gross weight)	(gross weight) (gioss weight)
1998	2,800,000	340,000	3,140,000	102,000	129,000	8,030
1999:		340,000	3,140,000	102,000	129,000	6,030
March	261,000	38,300	299,000	4,430 2/	1,240	784
April		101,000	289,000	4,430 2/	9,530	32
May:		101,000	209,000	4,200	9,030	32
Canada	117,000		117,000	10,100		53
Chile	4,700	36,300	41,000	10,100		33
Costa Rica	_ 4,700	30,300 91	41,000 91			
Germany		91	91		560	
Japan					6,470	
Japan Mexico	74,800	10,300	85,100	 578	0,470	
Nicaragua Nicaragua		10,500	193	3/8		-
Panama		193	103			
Peru		1,590	11,600		8,990	
Other		1,390	11,000	(3/)	38	
Total	206,000	48,500	255,000	10,600	16,100	53
Year to date		247,000	1,430,000	38,200	53,000	1,710
		247,000	1,430,000	38,200	33,000	1,710
Exports: 1998	2,250,000	241,000	2,490,000	20,000	299,000	164,000
1998		241,000	2,490,000	39,900	299,000	164,000
		0.220	75,000	20.000	20.700	4.000
March	66,600	9,230	75,900 53,000	20,800	20,700	4,080
April		15,000	53,900	3,040	45,100	2,060
May:	_			(0)	17	
Belgium				60	17	7.10
Canada				95	1,450	742
China					734	3,900
Dominican Republic				532		
France					326	
Germany				126	10,700	
Hong Kong				1,300	1,250	
India					93	
Japan					8,850	
Korea, Republic of				148	1,250	
Mexico	413	7,140	7,550		964	17
Netherlands				57	748	
Sweden					1,750	
Switzerland		2,150	2,150			
Taiwan				1,910	411	
Thailand				573		
United Kingdom	54,200	280	54,500	198	1,680	
Other				29	62	
Total	54,700	9,570	64,200	5,030	30,300	4,660
Year to date	325,000	37,200	363,000	34,800	132,000	20,200

^{1/} Data are rounded to three significant digits; may not add to totals shown.
2/ All or part of these data have been referred to the Bureau of the Census for verification.

^{3/} Less than 1/2 unit.

 ${\bf TABLE~5}$ U.S. IMPORTS AND EXPORTS OF SILVER, RAW, SEMIMANUFACTURED, AND WASTE AND SCRAP 1/

(Kilograms of silver content, unless otherwise specified)

Period and country	Silver ores and concentrates	Base metal ores and concentrates	Ash and residues	Total	Semimanu- factured form 2/3/ (gross weight)	Waste and scrap (gross weight)
Imports for consumption:	_					
1998	181,000	14,200	47,200	243,000	181,000	1,800,000
1999:	_					
March	_		51,800 4/	51,800		93,600
April			4,200	4,200	2,650	112,000
May:	_					
Australia	_		129	129		
Canada	_		770	770	17,600	57,600
Chile						456
Costa Rica	_					4,860
Dominican Republic						90
Germany	_				1,080	38,300
Ireland						17,300
Korea, Republic of	_					2,190
Malaysia	_					9,870
Mexico	_				1,060	4,000
Netherlands	_					206,000
Peru						1,020
Philippines	_					8,470
United Kingdom	_				195	1,500
Other					14	81
Total	_		899	899	,	352,000
Year to date	10,400		63,400	73,800	51,200	861,000
Exports:	_					
1998	6,540			6,540	154,000	1,060,000
1999:	_					
March	14,700			14,700		139,000
April	40			40	9,060	112,000
May:	_					
Belgium	_					1,520
Brazil					433	
Canada	13,500			13,500		55,300
China	_				154	11,700
Germany	_				86	7,330
Hong Kong	_				73	1,010
Hungary	_				50	
India	_				5	231
Israel	_				189	
Italy	_				485	6,220
Japan	_				268	1,620
Mexico	_				255	
New Zealand					35	151
Singapore					115	
Spain					847	
Sweden					8	9,920
Switzerland					812	
Taiwan					1,780	191
United Kingdom				29	442	1,120
Other	13			13	192	
Total	13,600			13,600	11,000	96,400
Year to date	48,900			48,900		615,000

r/ Revised.

^{1/} Data are rounded to three significant digits; may not add to totals shown.

^{2/} Containing 99.5% or more by weight of silver. Imports only.

 $^{3/\,}Semimanu factured$ (including silver plated with gold or platinum) forms of silver.

 $^{4\!/}$ All or part of these data have been referred to the Bureau of the Census for verification.

$\label{eq:table 6} TABLE\, 6$ U.S. IMPORTS OF PLATINUM-GROUP METALS 1/

(Kilograms of metal content)

	Platinum		Other		Platinum							
	grain and	Platinum	unwrought	Platinum,	waste and	Platinum	Unwrought	Palladium,		Unwrought	Unwrought	
Period and country	nuggets	sponge	platinum	other	scrap	coins	palladium	other	Iridium 2/	osmium	ruthenium	Rhodium 3/
Imports for consumption:												
1998	2,670	72,700	10,200	11,200	3,580	451	160,000	16,300	1,950	71	8,880	13,400
1999:												
March	575	3,680	679	4,750	71 4/	5	17,400	1,510	91		470	2,740
April	119	6,920	254	313	403	12	25,000	2,810	143	5	946	611
May:												
Australia					9	10						
Belgium	18	52	127				1,620					
Brazil				23								
Canada	10			34	708		421					
Chile								80				
Colombia			27		(5/)							
Costa Rica					50							
Dominican Republic					3							
Germany	32	252	52	47			333	206	12		147	29
Hong Kong				(5/)								
Israel			13									
Italy		41					26	1				
Japan	19			8	5		345	2				5
Malaysia					7							
Mexico					6							
Netherlands				3								
Norway		58					94	47				3
Russia		465	5				111	2,630				
South Africa		3,960		36			1,340	50	345		864	310
Spain				12								
Switzerland			16	2,210			468	439	2			
Turkey			(5/)	,								
United Kingdom		1,030	1	70	61	14	285	66	68			432
Total	79	5,860	242	2,440	849	24	5,050	3,520	427		1,010	779
Year to date	1,150	26,000	3,150	9,170	2,560	47	89,300	9,720	974	5	3,680	5,310

^{1/} Data are rounded to three significant digits; may not add to totals shown.

^{2/} Unwrought and other forms of iridium.

^{3/} Unwrought and other forms of rhodium.

^{4/} All or part of these data have been referred to the Bureau of the Census for verification.

^{5/} Less than 1/2 unit.

$\label{eq:table 7} \textbf{U.S. EXPORTS OF PLATINUM GROUP METALS 1/}$

(Kilograms of metal content, unless otherwise specified)

Period and country	Palladium 2/	Platinum 2/	Platinum waste and scrap	Iridium osmium and ruthenium 2/3/	Rhodium 2/
Exports:	_				
1998	_ 36,700	14,300	6,570	905	811
1999:	_				
March	_ 4,020	880	304	71	3
April	3,100	1,010	422	15	19
May:	_				
Australia	_ 13	12			
Belgium	_ 6		4		
Bermuda	_ 1	1			
Brazil		2		1	
Canada	142	89	28	20	(4/)
Chile		1,040			
China	481				
Cyprus	2				
Denmark	_ 2	3			
Dominican Republic					(4/)
France	51	21		(4/)	
Germany	216	162	34	5	
Hong Kong	1			(4/)	(4/)
India		9			(4/)
Ireland	31	39			20
Israel	367				
Italy	21	18			
Japan	56	355		2	
Korea, Republic of	82	10			
Kuwait	1				
Lebanon					(4/)
Malaysia	4				
Mexico	- 1	7			
Netherlands	32	14			
New Zealand	- 5				(4/)
Panama		2			
Philippines	10				
Saudi Arabia	4	1			
Singapore	- 5	1			
South Africa	255				
Spain	28				
Sweden	28	5	(4/)		
Switzerland	19	8		1	
Taiwan	811	5			
Thailand	- 9	(4/)			(4/)
United Arab Emirates	- ´-				(4/)
United Kingdom	130	44	102	1	
Total	2,820	1,840	168	30	21
Year to date	16,300	7,770	1,820	271	44

 $^{1/\,}Data$ are rounded to three significant digits; may not add to totals shown.

^{2/} Unwrought and other forms.

^{3/} Gross weight.

^{4/} Less than 1/2 unit.